



PROFACTOR®
DER DEUTSCHE QUALITÄTSSTANDARD

EN

TECHNICAL DATA SHEET AND USER MANUAL



**PRODUCT
CODE**

PF MB 842

**PUMP-MIXING UNIT
WITH THERMAL PROTECTION**

1. PURPOSE AND SCOPE

To create an autonomous circulation system for underfloor heating and radiator heating, modules consisting of pump-mixing units and manifolds are used. The pump-mixing unit with thermal protection is a complete preassembled fitting set (without pump) designed for forced circulation, regulation, and maintenance of the specified heat carrier temperature in water-based underfloor heating systems.

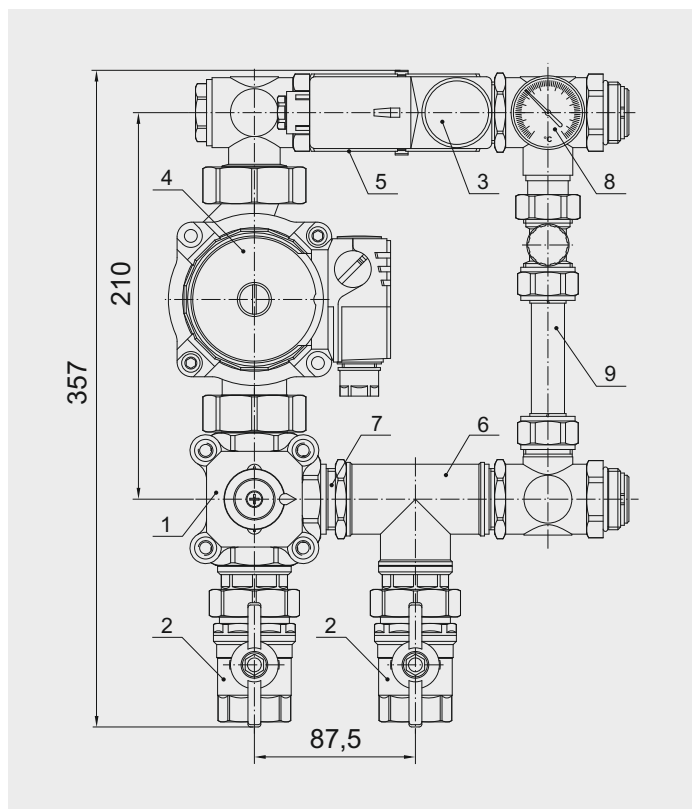
The efficiency of a heating system based on a manifold with a pump-mixing unit is achieved through the principle of multiple circulation of the heat carrier between the supply and return manifolds, with partial withdrawal of the heat carrier from the high-temperature source of the primary circuit and mixing with the return line flow. The mixing unit is required only for the underfloor heating system, as the same heat carrier circulates in both the floor loops and the radiators. However, the required heat carrier temperature for radiators (75°C–95°C) is significantly higher than the maximum permissible temperature for underfloor heating pipes (35°C–55°C).

The boiler heats the heat carrier to the temperature needed for high-temperature radiators, while the pump-mixing unit is used to reduce the heat carrier temperature at the inlet to the underfloor heating circuit. The heat carrier may consist of fluids that are non-aggressive to the materials of the product, such as water or glycol-based solutions, with a maximum glycol concentration of up to 40%.

2. TECHNICAL SPECIFICATIONS

Product code	PF MB	842
Nominal size	DN	25
	G	1"
Pump connection external thread	G1	1¼"; 1½"
Pump installation length	mm	130
Maximum working pressure	bar	10
Minimum inlet pressure before the pump	bar	0,1
Maximum flow capacity Kvs at $\Delta p = 1$ bar	m³/h	10
Maximum thermal power Q _{max} at $\Delta T = 10^\circ\text{C}$ and heat carrier velocity of 1 m/s	kW	45
Maximum heat carrier temperature in the primary circuit	°C	90°C
Maximum ambient temperature	°C	40°C
Temperature setting range of the surface-mounted thermostatic relay	°C	20°C to 90°C
Thermometer scale range	°C	0°C to 80°C
Weight	g	4530

3. DESIGN



- | | |
|--|--------------------------------------|
| 1 – Three-way mixing valve | 6 – Return pipe |
| 2 – Ball valve with union | 7 – Check valve |
| 3 – Surface-mounted thermostatic relay | 8 – Thermometer |
| 4 – Circulation pump | 9 – Adjustable manifold bypass valve |
| 5 – Supply pipe | |

The pump-mixing unit with thermal protection consists of a three-way mixing valve (1), two shut-off ball valves with union (2), a surface-mounted thermostatic relay (3), supply (5) and return (6) pipes, a check valve (7), a thermometer (8), and an adjustable bypass (9).

The circulation pump (4) is not included in the package.

The unit is compatible with pumps having an installation length of 130 mm and an external connection thread of 1¼" or 1½" (depending on the union nuts installed on the unit). A shut-off ball valve with a union is attached to the inlet port of the three-way mixing valve, while a bushing with a union nut — featuring a 1¼" or 1½" cylindrical thread (depending on configuration) — is screwed into the opposite outlet port for pump connection.

A threaded coupling sleeve with a locknut and sealing rings, containing a check valve, is screwed into the side inlet port. A return pipe, designed as a tee with an internal cylindrical thread of 1", is connected to the opposite end of this sleeve. A shut-off ball valve with a union is also installed on the side outlet of this tee.

The pump outlet is connected via a union nut with a 1¼" or 1½" cylindrical thread (depending on configuration) to a special tee with a hollow nut, 1" external cylindrical thread, and a sealing ring for connection to the supply pipe. The opposite outlet of this tee is closed with a plug. A surface-mounted thermostatic relay is attached to the supply pipe using a spring wire clamp.

The adjustable bypass is connected to the pipes using threaded coupling sleeves with locknuts and sealing rings. At both ends, the bypass is fitted with nuts having 1" external cylindrical threads and sealing rings for connection to the manifold. An axial thermometer is installed in a socket on the upper bypass tee.

The pipes, union nuts, threaded coupling sleeves with locknuts, mixing valve body, ball valve bodies, unions with nuts, plug, and bypass tees are made of brass grade CW617N (DIN EN 12165-2011), with nickel-plated surfaces. The check valve body and thermometer sockets are made of brass grade CW614N (DIN EN 12165-2011).

The housing and adjustment knob of the thermostatic relay, as well as the stop insert and valve plug of the check valve, are made of impact-resistant technical thermoplastic resin (acrylonitrile butadiene styrene, ABS). The springs are made of stainless steel AISI 304 (DIN EN 10088-2005). The thermometer body is made of stainless steel AISI 304 (DIN EN 10088-2005). The thermometer scale is made of aluminum and covered with acrylic glass.

All connections are sealed using O-rings made of ethylene-propylene rubber (EPDM).

All cylindrical pipe threads are in accordance with ISO 228-1:2000, DIN 259, and all metric threads are in accordance with ISO 261:1998.

More detailed descriptions of the components included in this unit can be found in their respective technical passports.

4. OPERATING PRINCIPLE

The pump-mixing unit PF MB 842 is a sequential-type mixing assembly. The main advantage of this type of mixing is that the entire pump flow rate is delivered directly to the consumer.

The circulation pump drives the heat carrier through the underfloor heating loops, drawing it from the return manifold and directing it into the supply manifold. From the supply manifold, the heat carrier flows into the underfloor heating circuits and then back into the return manifold. This secondary circuit cycle continues until the water cools down. A three-way mixing valve is installed on the supply pipe from the boiler.

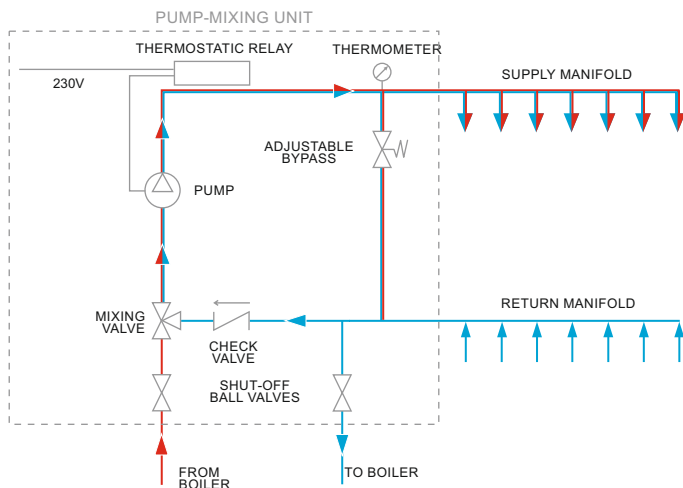
When the temperature of the heat carrier drops below the set value, the mixing valve opens the passage for hot fluid from the boiler, mixing it with the cooled return flow coming from the secondary circuit. At the same time, the excess heat carrier volume is discharged from the return pipe outlet back to the boiler (primary circuit). Thus, the cooled heat carrier from the return manifold circulates continuously, while the hot heat carrier is supplied only when necessary.

For automatic mixing control, the mixing valve must be equipped with an electric actuator connected to the control automation system.

The surface-mounted thermostatic relay protects the underfloor heating circuit from excessive temperature rise. When the temperature exceeds the preset value on the relay, the pump switches off. Once the temperature drops below the setpoint, the pump switches back on. This prevents overheating of the underfloor heating system and extends its service life.

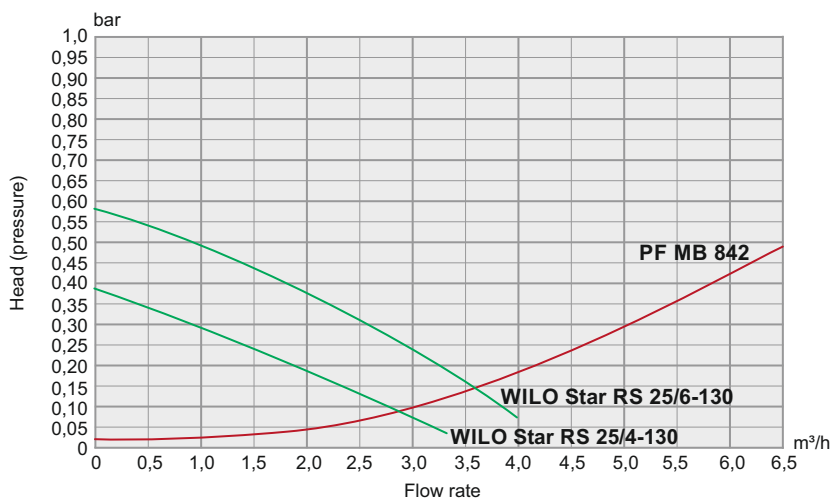
The check valve prevents hot fluid from the boiler from entering the return manifold. The adjustable bypass protects the unit from overload. When the underfloor heating loops are closed, the circulation of the heat carrier in the secondary circuit continues through the adjustable bypass, maintaining safe and stable operation.

Operating diagram of the pump-mixing unit with thermal protection:

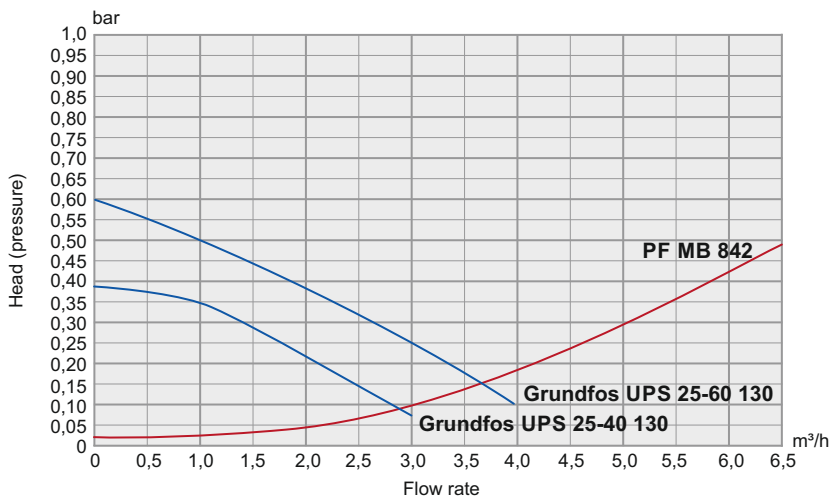


5. HYDRAULIC CHARACTERISTICS

Hydraulic characteristic of the PF MB 842 pump-mixing unit compared to WILO pump characteristics:



Hydraulic characteristic of the PF MB 842 pump-mixing unit compared to Grundfos pump characteristics:



6. INSTALLATION INSTRUCTIONS

Before installing the pump-mixing unit, the pipeline must be thoroughly cleaned of rust, dirt, scale, sand, and other foreign particles that could affect the performance of the unit.

Upon completion of installation, heating and heat supply systems must be flushed with water until it runs clear, free of mechanical impurities.

First, the manifold should be connected to the pump-mixing unit using the union nuts on the bypass with external threads. The supply manifold is mounted on the upper pipe of the unit, and the return manifold on the lower pipe. The connection is sealed using O-rings and does not require additional sealing materials.

The assembled structure must be installed vertically, at a height of at least 300 mm above the floor, using mounting brackets fixed to the manifold body, either inside a manifold cabinet or directly on the wall.

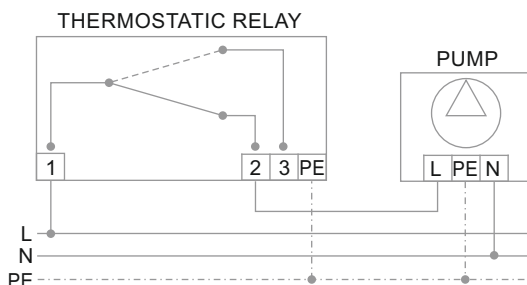
The connection to the main pipeline is made via cylindrical pipe threads. The supply pipe must be connected to the shut-off ball valve with the red handle, and the return pipe to the shut-off ball valve with the blue handle.

The pump to be installed in the designated mounting position must have a base length of 130 mm and an external thread on the mating flanges of 1¼" or 1½" (depending on the union nuts of the pump-mixing unit). During pump installation, special flat ring gaskets must be used to ensure a proper seal. The unit should be installed so that the pump motor shaft is positioned horizontally.

The electrical connection box must not be located at the bottom. The pump flow direction should be upwards, toward the supply manifold. It is not recommended to attach the unit directly to load-bearing structures or building elements to prevent possible transmission of noise or vibration. Avoid mechanical damage to the mixing unit and protect it from contamination with construction materials or splashes.

The surface-mounted thermostatic relay is attached to the supply pipe of the pump-mixing unit using a spring wire strap. To improve thermal contact between the relay and the pipe, thermoreactive aluminum paste should be applied. Then, the thermostatic relay must be connected to the pump and to the power supply according to the wiring diagram provided below.

Wiring diagram for connecting the thermostatic relay to the pump and power supply:



It is essential to ensure that air vents are positioned strictly vertically at the highest point of the autonomous circulation system. The dimensions of the manifold cabinet vary depending on the number of manifold outlets and the size of the pump-mixing unit.

The autonomous circulation system must not be subjected to any loads from the pipeline, such as bending, compression, tension, twisting, misalignment, vibration, or uneven tightening of fasteners. If necessary, supports or compensators should be provided to reduce the load exerted on the unit by the pipeline.

The misalignment of connected pipelines must not exceed 3 mm per 1 meter of length, plus 1 mm for each additional meter.

All components of the system must be securely connected to the pipeline, using PTFE-tape sealing (polytetrafluoroethylene), polyamide thread with silicone, or flax fiber as sealing material. It is important to ensure that excess sealing material does not enter the shut-off or regulating mechanisms of valves, cocks, or fittings, as this can lead to malfunction. Check the correctness of installation.

After installation, the system must undergo a pressure (manometric) tightness test. This test ensures the system's integrity and prevents potential leaks and associated damage. Before testing, make sure that all union nuts are securely tightened.

When using the autonomous circulation module in systems where the fluid contains a high concentration of mechanical impurities, a mechanical filtration unit should be installed upstream of the pump-mixing unit.

7. OPERATING AND MAINTENANCE

The pump-mixing unit must be operated without exceeding the pressure and temperature values specified in the technical specifications table.

Installation, removal, as well as any repair or adjustment operations, must be performed only when the system is depressurized. Allow the equipment to cool to ambient temperature before performing any work.

Before switching on the pump, open the shut-off ball valves, fill the system with the heat carrier, vent all air, and set the desired heat carrier temperature. The set temperature can be monitored using the thermometer located on the supply pipe of the unit.

Attention: Due to system inertia, the set temperature will not be reached immediately but only after a certain period of operation. After stabilization, the desired maximum temperature limit should be set on the surface-mounted thermostatic relay.

To prevent unwanted tripping of the thermostatic relay, it is recommended to set its temperature 5° – 7°C higher than the maximum design supply temperature of the underfloor heating system.

During operation, monitor the system for absence of leaks and unusual noise from the pump.

8. WARRANTY OBLIGATIONS

The warranty period is 24 months from the date of sale to the end consumer. Throughout the entire warranty period, the manufacturer guarantees the proper functioning of the product and its compliance with safety requirements, provided that the consumer follows the rules for storage, transportation, installation, operation, and maintenance of the product. The warranty covers all defects arising through the manufacturer's fault.

The warranty does not cover defects resulting from:

- Violation of storage, transportation, installation, operation, or maintenance conditions;
- Exposure to substances aggressive to the materials of the product;
- Signs of mechanical damage;
- Damage caused by fire, natural disasters, or other force majeure circumstances;
- Damage caused by improper actions of the user;
- Evidence of unauthorized interference with the product design.

The product described in this technical manual is a technically complex device that must be installed by a qualified specialist with appropriate experience working with this type of equipment.

Installation and commissioning must be carried out by an authorized and certified company.

Profactor Armaturen GmbH reserves the right to make changes to the product design that do not affect its technical characteristics or functional features.



INTERNATIONAL WARRANTY CARD

NAME OF THE PRODUCT

PRODUCT CODE, SIZE

QUANTITY

SELLER NAME AND ADDRESS

DATE OF PURCHASE

SELLER STAMP

SELLER SIGNATURE

For the warranty term refer to the Warranty obligation clause in the technical manual

FOLD LINE

FOLD LINE

In case of any claims to the product quality the following documents should be submitted:

1. Application with customer and product details:

- Name of the customer, actual address and phone number
- Article of the product
- Reason for the claim and photo
- Plumbing system where installed (name, address, phone number)

2. Invoice copy and receipt

3. Warranty card

RETURN/EXCHANGE COMMENTS

DATE

SIGNATURE



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